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CEPHALALGIA OCULARIA.

BY C. M. CULVER, M.A., M.D., ALBANY, N. Y.

During the session for 1889, of the Medical Society of the State of New York, Dr. Charles A. Dana, Professor of Nervous and Mental Diseases, in the New York Post-Graduate Medical School, who is not a specialist in Ophthalmology read a valuable paper, entitled: "On Chronic Headaches of Functional Origin." The study, represented by this paper, was based on the records of 200 cases. I will quote a paragraph from page 201, of the 1889 Transactions of the above named Society:

"*Ocular Headaches.*—At the present time the eye is credited with giving rise to an immense number of head pains. Their location and character depend not only upon the pathological condition of the eye, but also upon the constitution and occupation of the patient. From my investigations, it seems to me that the most general rule which one can formulate is that headaches from refractive errors are usually frontal or orbital; those from muscular insufficiencies are more often occipital and cervical."

That part of Dr. Dana's paper specially attracted my attention, because it was direct confirmation of the conclusions de-

rived from my own study and practice. It has long seemed to me that the headache produced by general strain of the ciliary muscle, as when a novitiate presbyope insists on keeping his eyes 43 years old until the rest of his body is 46, or when a hyperope makes those muscles do for him what glasses ought to do, that headache is apt to be frontal and orbital. I have seen enough cases in which temporal headache and astigmatism were correlated, to suggest the possibility that such eye-strain as is due to uncorrected astigmatism is causative of that kind of headache. There is a cephalalgia, felt specially at the vertex, that patients have often enough told me was relieved by relief of the eyes from strain, so that it appears to me to be possibly caused by ocular anomalies; but of what kind the latter must be, in order to cause the former, I have not yet discovered. As regards occipital headache, my experience has led to conclusions that are well stated by the above quotation, from Dr. Dana's article. Occipital headache is most often produced by lack of positive convergence power.

On page 276 of Treat's "*International Medical Annual*", for 1889, Dr. Dana has published this: "Perhaps the most important contributions to the therapeutics of headache and migraine of late are showing relation of these troubles to ocular disorders. As a matter of course, hyperopia nearly leads its class as a producer of headache." Dr. Noyes[1] says: " * * * in many, hyperopia is the couse of chronic headache."

Meyer[2] writes: "thus, by simple inspection, without having recourse to examination with glasses, we can often detect a pronounced hypermetropia. Again, patients never fail to tell us that they do not see so well near at hand as at a distance, and that their eyes get very easily tired when their work requires close application. This feeling of fatigue in the eyes is accompanied with pains in the periorbital region and sometimes with headache."

[1] Noyes, "Disease of the Eye," page 59, line 7 from bottom.

[2] Meyer, "Disease of the Eye," page 429, line 7.

Mr. Frost[3] writes: "Actual defect of near vision is seldom complained of except by hyperopes whose ametropia is of high degree, or who are over 30, and whose accommodations has consequently become impaired. The symptoms arising from excessive efforts are much more common. These consist in an inability to read or work for long together, especially towards evening, pain and conjunctival injection on making the attempt, and headache always brought on by prolonged use of the eye. Occasionally this headache is the most prominent, or the only symptom."

Again, in the same treatise,[4] we find: "When the inequality between the internal and external recti is considerable, or when, with even a slight inequality, the general tone is lowered the attempt to fix both eyes upon a near object for any length of time gives rise to a feeling of fatigue and sometimes to headache, symptoms, in fact, which are similar to those produced by hypermetropia."

At the last meeting of the American Ophthalmological Society, Dr. Myles Standish, of Boston, read a paper on partial tenotomies. The *American Journal of Ophthalmology*[5] says of this: "The author reported five cases in which he had performed this operation on account of constant headache, inability to use the eyes and neurasthenic symptoms. In all but one there was prompt relief of the local and general symptoms by the operation."

I should be inclined to say that evidence of the production of headache by ocular anomalies is to be found in every good book on general ophthalmology, but for the fact that, in lately studying this subject, I have consulted standard works on eye-diseases, without finding what I sought, that is, mention of ocular headache. But I still think that the reason why I have not found such memtion in some of the books just alluded to, is that I have not looked in the right place; because, I see no

[3] Frost, in Carter and Frost's "*Ophthalmic Surgery*," page 406.

[4] *Ibid.* page 463.

[5] *American Journal of Ophthalmology*, August, 1889, page 252.

reason why my experience should differ from that of the average ophthalmic practitioner, and, though I think I never led up to that topic in examining eyes, headache is being constantly given, as a part of my patients' subjective history, and the relief of it, by ophthalmic treatment, is a gratifying feature in much of my practice.

In the *American Journal of Ophthalmology*, Dr. Thomas Featherstonhaugh[6] has reported a case of insufficiency of the externi; a part of the report reads: "The subjective symptoms which led him to seek advice were pain in both eyes and head." * * * * The treatment was by means of tenotomies of preponderant interni. A part of the statement of the result, is this: "I have lately received a letter from this patient, in which he says that he has been able to use his eyes as freely as any of his friends; that he studies hard without the least sense of discomfort, and feels confident that the eye question, so far as he is concerned, is solved." Of course, the head pains, referred to, in this report, constitute the part to which I would now especially call attention.

Again, I propose citing ten of my own cases, wherein headache has been relieved by treatment directed to the patient's eyes.

Case I. (907). Mr. H. P. A., æt. 19 years, consulted me July 13, 1887. He had first written me an account of his headache and asked if I could relieve it. I have a copy of my answer, and would cite it as merely giving a statement of my "platform" relative to such cases, but for the facts that it would too much protract this writing, and has no special bearing on the matter under discussion. In that answer, I said, as courteously as I could, that no subjective history alone, could be of the same value to a physician, as a direct examination. That, from his account, it seemed highly probable that an oculist could best serve him; but that I could not promise a cure; that, in my experience, the irresponsible physicians were most profuse with

[6]Featherstonhaugh *American Journal of Ophthalmology*, November, 1886, page 327.

promises, while the trustworthy ones were most careful about encouraging prognostication when they had no opportunity to make a thorough examination. In the patient's first letter, he wrote that he had "had very severe headache often, for the past two years; pain in eyes, especially after having done near work." In the summer of 1885, a colleague had prescribed, for each eye, a cyl. + 0.50 D. axis 90°. I found the refraction of the patient's eyes such that these glasses were beneficial so far as their effect went. In the autumn of 1885, Dr. Thomson, of Philadelphia, had used atropia for three days in patient's eyes, and had prescribed for each, sph. +0.50 D. ⌒ cyl. +0.50 D. axis 90°, and the patient had worn those glasses for six months. I assured the patient that if anybody knew what his eyes needed at the time of that examination it was Dr. Thomson. I wrote to Dr. Thomson, asking whether those glasses were designed to be a full, or only a partial correction of the ametropia. Dr. Thomson's reply assured me that the correction afforded by the glasses, was full; accordingly, I told the patient that those glasses could not be improved on, and that he would do well to wear them constantly, until their acceptance for all distances was complete. I found the positive convergence abnormally restricted; as I do not think Dr. Thomson would have disregarded such an anomaly, had it been present when he corrected the ametropia, I assume that it had arisen in the interval between his examination and mine. My record of the treatment advised, reads: "To wear Dr. Thomson's glasses all the time; and to practice orthoptic training of the interni, by prisms and directly, according to directions given." (Such directions concerned the fixation of a prominent object which was being approached to the eyes, in the median plane of the body; such exercise was to be given to the interni ten minutes at a time, each morning and evening, until nine metre-angles of positive convergence were feasible.) On August 1, 1887, the patient wrote to me: " * * * * since wearing my glasses again I have noticed a marked improvement in my headache." Ten days later he wrote that he had more than trebled his positive convergence, as measured by the adducting

prisms whose action his eyes could overcome, while fixing a candle, 6 metres distant, and added: "Think my head is improving still." On September 7, 1887, he wrote to me from a summer-resort in Pennsylvania, reporting ability to use 9 metre-angles of positive convergence (measured as above stated) and added: "My head is much improved and I am here in order that the bracing mountain air may effect an entire cure."

Case II.—(1388.) Mrs. E. J. C., æt. 29 years, consulted me December 3, 1888. The subjective history included: "Think that eyes make headache." I found a simple, hyperopic astigmatism of each eye, and prescribed for each a Cyl.+0.75 D. axis, 90°. Having heard, several months later, from another patient, that Mrs. C. had experienced considerable relief from headache, as a consequence of the optical prescription I made in her behalf, I lately wrote, asking her to tell me concerning any effect that treatment of her eyes had seemed to her to have, in the diminution of her headache. Following is the chiefly pertinent part of her reply: "I have suffered from both sick and nervous headache for about twenty years. No medicine ever seemed to help me for any length of time. Could never go out in the morning, or take a pleasure trip, no matter how short, without suffering for hours with headache. Since December, 1888, when I began wearing glasses prescribed by you, I have had very few headaches; it is now nine weeks since the last attack."

Case III.—(939). Miss K. M. G., æt. 14 years, acted on a suggestion from Prof. Cady Staley, and, on August 2, 1887, consulted me, regarding her eyes, giving a subjective history of "much headache, when at school." There was also, as is comparatively frequent, in cases of similar refractive errors, a history of asthenopia, nervousness and insomnia, but, as these do not bear on ocular headache, will not receive further attention herein. Each eye had compound, hyperopic astigmatism of the correction of which I prescribed only the cylindric portion since she was young and fairly robust; without glass or mydriatic, each eye had V.$<{}^{20}/_{L}$. With a Cyl.+0.75 D., axis 90°, each had V.$={}^{20}/_{XX}$ of Snellen vision. On November

19, 1887, Miss G. called on me; the report of that call in my case-record, contains this: "Patient reports great benefit from my prescription for her; she no longer has sore eyes or headache." An interesting part of that report was that she had been obliged, a short time previously, because of having facial erysipelas, to lay aside the spectacles, for a time; the headache and asthenopia then resumed their sway, but surrendered again, when the spectacles were again donned. I last saw the patient on September 11, 1889, when the report was quite as favorable, there having been no recent trouble from headache; near work, when long continued, had again become irksome to her eyes, and she then accepted and I prescribed the complimentary spherical lenses.

CASE IV.—(1340). Miss M. E. W., æt. 16 years, consulted me May 31, 1888 The subjective history, then given, reads: "Has much headache; general health is poor. Has all three kinds of eye-headache; temporal headaches predominate. Pupils have been unnaturally dilated. Is very nervous." Without glass or mydriatic, the right eye had Snellen vision of $^{10}/_{cc}$; with Sph.—3.50 D.⌒Cyl.—0.75 D., axis, 90°, V.=circa $^{20}/_{xx}$, (read all of some 6-metres lines, but not all of others). Without glass or mydriatic, the left eye had $^{12}/_{cc}$ of Snellen vision. With Sph.—2.75 D.⌒Cyl.—0.75 D., axis, 45°, vision was about $^{20}/_{xx}$. I prescribed the cylindric lenses, just named, each in combination with a spheric—1.50 D. On July 25, 1889, the patient called on me, and reported that, since I had prescribed for her, she had not had "nearly so many headaches." I then found that considerable myopia had been acquired since she first consulted me, and I increased the minifying strength of the spheric part of the lenses first prescribed by me for this patient by 2.50 D.

(Let me say, parenthetically, that, although I do not yet quite concur with Dr. Edward Jackson, concerning the full correction of real myopia. I have so high an opinion of his judgment that, at my solicitation, he prescribed the glasses which now adorn my visage, and a discussion which he and I had, on July 19, 1889, while walking from The Polyclinic to

his consultation-rooms, has led me to approximate such full correction, at least experimentally, more nearly than I had formerly done.)

Thinking this an illustrative case of ocular headache, I wrote to Miss W., asking her to tell me, 1st. If she had formerly been much troubled with headache. 2nd. If she thought that the treatment, which her eyes had received, had resulted in relief of her headache; and 3d. How much that relief had amounted to. The reply reads: "I was troubled constantly with severe headaches, so that I was never really free from them, for about two years, till I put on the glasses you prescribed for me, when, for a time, I was not troubled at all with headache. But, within two or three months of your second prescription, the headaches returned, though they were not so severe as formerly; but the glasses relieved me, and I am now almost entirely free from headache."

CASE V.—(1334). Mr. J. T. Y., æt. 25 years, consulted me May 24, 1888; headache was the prominent symptom complaimed of; he gave this history: "In school, eyes became very tired; five years ago, got a bit of oat-chaff in right; it grew on; then left couldn't read; left eye is of no benefit. Dr. Bontecou, of Troy, removed chaff. In 1885, consulted an ophthalmological colleague, who prescribed reading-glasses; these tired eyes. Dr. G. Lyon, his physician, reports to me, as on the patient's part, non-mastication, overwork, indigestion and constipation." I found nothing wrong with the cornea of either eye; the right had V.$<{}^{20}/_{XX}$, without glass or mydriatic; it had a trifle better vision when a Sph.+2.50 lens was before it. Without glass or mydriatic, the left eye had V.$<{}^{20}/_{C}$, but this was increased to ${}^{20}/_{LXX}$ by a Sph.+4.00 D. I prescribed Sph.+2.50 D., for the right, and Sph.+3.00 D. for the left eye. On September 5, 1889, he reported that he had "had but very little headache and constipation since I prescribed glasses."

CASE VI.—(1705). Mrs. R. This case had been reported to me earlier, and casually, by Dr. A. O. Roberts, of West Sand Lake. July 24, 1889, this gentleman brought the patient to con-

sult me. At that time, the subjective history was: "Near work makes eye-balls pain very much; has always been subject to headache, since she can remember." Koroscopy showed me that each eye was hyperopic, vertically by 0.50 D., the right eye horizontally by 0.75 D., and the left, horizontally by 1.00 D. Without any glasses, the patient had normal, distant Snellen vision, but this was improved by Sph.+0.50 D.⌒Cyl.+0.25 D., axis 90°, for the right, and Sph.+0.50 D.⌒Cyl.+0.50 D., axis, 90°, for the left; with both these glasses, saw Snellens 6-metres letters, at 6 metres, "splendidly" (*ipsa dixit*) and with either eye, alone, as well as with the other. On September 24, 1889, patient reported that the eyes had felt "ever so much better" since I had prescribed for them (the prescription having called for just such glasses as are above described). "Headache has been much bettered." But she gave an account of having had "two real hard headaches;" had gone to a pic-nic without the glasses, and in half an hour, had had a headache. On September 24, I found inability, on the part of the *externi*, to overcome the action of any abducting prism; orthoptic training was therefore prescribed and is not yet concluded; at the time of the first call there had been esophoria of 1.50 minimum-deviation degree. While the headache, in this case, has certainly not yet been entirely "cured," by eye-treatment, it still seems to me illustrative of the points the truth of which this writing seeks to demonstrate.

Case VII will be a continuation of the history given on pages 192 and 193 of the issue of The American Journal of Ophthalmology for June, 1888. Miss F. and her father called on me September 19, 1889. Mr. F. said that the patient had lately broken the spectacles that I had formerly prescribed for her; the repairing of them had required her non-use of them for about a day, during which time the headaehe and nausea, which had annoyed her before I had prescribed for her, and not returned between the times of that treatment and of the spectacle-fracture, had returned and troubled her, just as formerly. Resumption of the spectacles, when they had been re-

paired, had caused the disappearance of the nausea and cephalalgia.

CASE VIII.—(642). Miss M. V., æt. 13 years, consulted me November 1, 1886. There was simple hyperopic astigmatism, in each eye, and a history of "headaches after using eyes." On the 24th of the same month, (the patient, in the interim, having worn convex cylinders, prescribed by myself) Miss V. and her mother both reported to me that the patient had had entire relief from her headache. (Parenthetically, again, I would say that there are other, so interesting points, in the history of this case, that, in not reporting them, the writer resists a temptation; the most recent report from the patient, was as satisfactory as any has been; but certain things have happened, to the eyes in question, that, not very long ago, I would have pronounced incredible or impossible. The reason, for not reporting these interesting points, is that they and ocular headache are not especially correlated.)

CASE IX.—(707). Mrs. S. A. S., æt. 29 years, acting on the advice of Dr. S. A. Russell, consulted me December 27, 1886. The recorded history reads: "Has had headache for 13 years; had some spinal trouble 4 years ago. (At that time, for 3 months, could not read a line.) General health fairly good at present. Is a teacher and, on dark days, feels 'eye-strain' in school-room; this is always followed by (and, patient says, 'produces') headache." Both eyes, without glass or mydriatic, had, at time of consultation, Snellen vision of $>{}^{20}/_{XXX}$; either eye, under like conditions, had V.$={}^{20}/_{XL}$; during complete mydriasis, both had V.$={}^{20}/_{LXX}$; right same as both; left, V.$={}^{20}/_{L}$; with a cyl.$+1.25$ D., axis 90°, for the right, and a cyl. $+1.50$ D., axis, 90°, for the left, either eye had V.$={}^{20}/_{XX}$. On November 21, 1887, the patient wrote: "My eyes seem much better." She further refers to the use of Atropine discs, which, in order to expedite the acceptance of the glasses, I had prescribed for weekly use, and adds: " * * * on Saturday, following their use, could see distant objects very distinctly, with my glasses, and on Sunday could read with ease and without headache being the result." Some weeks

after the consultation, Dr. Russell told me that the glasses prescribed had quite relieved patient's headaches.

CASE X.—(1684). Miss I. G., æt. 17 years, consulted me July 1, 1889, acting on the advice of Dr. A. O. Roberts, of West Sand Lake. As subjectively stated, patient had had some photophobia, at first; had worn dark glasses and gotten rid of photophobia. Had had some dimness of vision. Had headache, she said, "about all the time." Simple astigmatism, corrected by cyl.+0.50 D., axis 90°, was found in each eye, and such a lens prescribed for each. On September 2, 1889, patient reported favorably of my treatment; the headache had been much relieved by the use of my prescription; "but, for last three weeks, has had headache." On examination, I found spasm of the ciliary muscle of each eye, and prescribed five centigrammes of sulphate of atropia, to twenty grammes of water, a drop of which weak solution was to be instilled in each eye every evening. Just two weeks later, she reported that, during the interval, her head had not ached at all.

As stated in the peroration of my previous article on this topic, I consider ocular headache a matter worthy of further discussion. "Stomach-headache" has become a "household word;" we only rarely hear, except from our colleagues, any mention of headache of which ocular anomalies are productive. As before said, of this subject, "my present purpose is to discuss it further, in the future." But if that be done at all, it will probably be in a manner somewhat differing from the present one; that is, I prefer to give histories of cases, with the treatment of which I have had nothing to do. Some colleagues have promised to furnish such histories.

Again, it is my purpose to trace out the connection between eye-strain of the different kinds, and the various forms of cephalalgia resultant thereon.

RETINITIS PIGMENTOSA TREATED BY INJECTIONS OF STRYCHNINE.

BY S. C. AYRES, M.D., CINCINNATI, OHIO.

Carrie B., æt. 11 years, was first seen about two years ago. At that time she was very amblyopic, her vision being 0.1 in the right eye, and 0.2 in the left. Her field of vision was markedly contracted in both eyes, and although she was going to school, it was with great difficulty she was able to study.

The retina presented the characteristic alterations which are seen in pigment infiltrations. The optic discs were very much blanched and the large vessels were smaller in caliber than normal. There was also a circumscript choroiditis in both eyes.

Her health has always been delicate and her physiognomy is characteristic of the inherited specific type, the upper incisors are notched and the corneæ have a cloudy appearance although she never had interstitial keratitis.

At present her vision in the right eye is reduced to bare perception of light, the optic disc is very much blanched and the large retinal vessels appear like mere threads upon it. In the left eye the vision is about what it was two years ago (0.2), but her field of vision is very much more contracted, the vessels on the disc are very much smaller than normal and the capillaries have entirely disappeared. Her field of vision is so contracted that she cannot walk around in a room with ordinary light, without stumbling over chairs and tables. On a cloudy day or at twilight she has to be led. This contraction in the field of vision has increased very considerably within the past year.

Knowing the influence of the hypodermic injections of strychnia in cases of atrophy in toxic influences, I determined to

try its effects in this case, and began the use of $^1/_{24}$ of a grain. I did not tell her what influence it would have but waited for her to tell me what her sensations were.

Before beginning its use, her vision was tested with the perimeter and found to be 10° in all directions. In three days she remarked that she was able to see objects in the room better and was able to walk in the hall which was moderately well lighted, without assistance, a thing she could not do when she came.

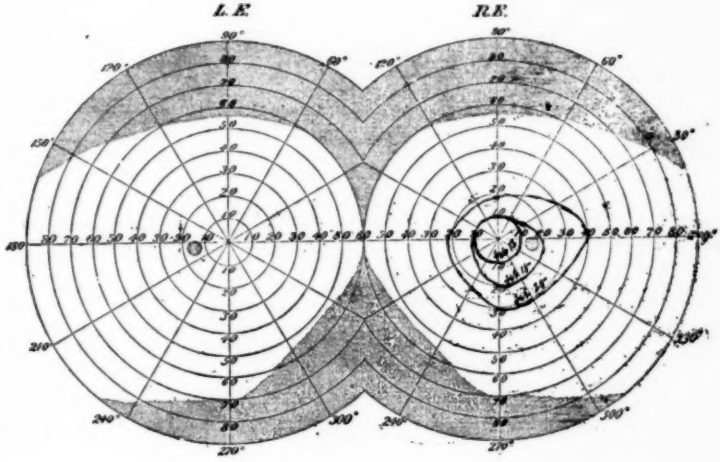

FIG. 9.

Her field of vision was again tested and was found to have increased to 20° downward and outward. The hypodermic injections were continued for ten days longer when the test of her field of vision was again taken and it had increased in all directions; directly upward it was 20°, inward 22°, outward it was 40°, and downward 30°. This increased field of vision gave her much more comfort in walking around and seeing objects in the room as well as enabling her to walk with more security on the street. Her central field for reading was markedly improved also.

Before the strychnia was used she was able to read Snellen $3^1/_2$ slowly, but when she left she was able to read $1^1/_2$ with as much ease as she had read $3^1/_2$ at first. Her face had a different and more intelligent expression and she was enabled to walk with greater security.

There was also some improvement in the left eye; when she came she was barely able to see shadows of the hand, but before she left she was able to count fingers a few inches from her face and the amount of improvement on that side was a source of great relief to her. It is not likely however that it will ever be increased beyond what it is now.

In the transactions of the American Ophthalmological Society for 1886, Dr. Hasket Derby contributes some interesting observations on "The Possible Retardation of Retinitis Pigmentosa by the use of the Constant Current Battery." The results are very encouraging and quite sufficient to justify us in giving every such case the benefit of the doubt.

These cases have been long enough classed among the incurables and if there is any benefit to be derived from electricity or strychnine they should have it. I have seen such excellent results from the use of strychnine in toxic cases where the disc presents a very similar appearance, that I thought it a fair case to treat.

Two years previously she had been sent home without any treatment and there was a marked narrowing in the field of vision.

We are not encouraged to treat these cases by the text-books. The latest one out says "no treatment can be said to be of the slightest avail." This is only one case and proves nothing, but it certainly encourages me to hope for more good results in other cases.

A FATAL CASE OF PHLEGMONE OF THE ORBIT.

BY ADOLF ALT, M.D.

Although the number of cases of phlegmone of the orbit that have come under my personal observation is decidedly up to the average, I have so far only once been unlucky enough to see such a case end fatally in spite of all endeavors.

On October 5, 1888, I was called to see in consultation, D. S., æt. 40 years, a strongly built man. He was then reconvalescent from a pneumonia which had attacked him some six weeks before. I was told by the physician in attendance that four days previous to my visit the right lid had become swollen, the eye had become protruding and the patient had complained of headache. In spite of an application of iced compresses and of nitrate of silver to the conjunctiva, the condition had not improved.

After having heard this history I was no little astonished to find an enormous exophthalmus of the right eye. The lower lid was perfectly everted, the upper lid barely covered one-third of the cornea. The cornea was "steamy," and the iris and lens seemed to be so closely pressed to its posterior surface, that no anterior chamber could be made out.

The swollen lids were of a dark, purplish color. Neither the eyeball nor the lids could be moved and were stone hard. V=0. In spite of a careful palpation no trace of fluctuation could be detected.

I had the patient at once moved to the hospital and hot applications applied to the eye continually. This seemed to relieve the patient considerably, and two days later, on the 7th, the eyeball could be slightly moved and on palpation fluctuation could apparently be easily felt in the upper inner part of

the orbit. I then made a deep incision into the orbital tissue in that region, enlarged it and probed to the depth, but without getting at any pus. The pretty free bleeding seemed, however, to relieve the patient, and when I saw him toward evening of the same day, he declared that he felt considerably better, and could move the eyeball and upper lid to a limited extent. I kept the wound open, had it frequently irrigated with a sublimate solution, and the warm compresses continued.

The night after the incision the patient became delirious and had a high fever. Toward morning the delirium passed away and the fever disappeared almost totally under the influence of antipyretics. The next day the swelling of the lids and the exophthalmus were markedly improved and a piece of necrosed tissue was visible in the conjunctival wound. After its removal a small amount of pus could be pressed out of the orbit. The patient stated that he was feeling much better, even his headache had gone. He was in a moderate sweat, but his temperature was above normal.

The next day, on the 12th, in the afternoon, we were hastily called to the patient. He had had a sudden collapse and the nurses had thought him dying. We found him evidently in a dying condition. His face was pale, his lips blue, the extremities cold, the pulse small and very frequent, respiration laboring. The patient was semi-unconscious and unable to speak, although he would attempt to do so. He had, moreover, incessant clonic spasms of the muscles of the limbs and arms. In this condition he lingered on, unchanged, in spite of medication, and he died during the night of October 14.

The post-mortem examination, which was made the next day, confirmed the diagnosis of purulent meningitis, especially at the base of the brain. No macroscopical connection between the small pus cavity in the orbit, behind the eyeball, and the pus in the meninges could be found.

PRESIDENTIAL ADDRESS ON OPHTHALMOLOGY AND GENERAL MEDICINE.

BY J. HUGHLINGS JACKSON, M.D., F.R.C.P., LL.D., F.R.S.,

Physician to the London Hospital, and the National Hospital for the Paralyzed and the Epileptic.

Delivered before the Ophthalmological Society of the United Kingdom.

No professional honor could be more pleasant to me than is the Presidency of the Ophthalmological Society. I thank you for it with all the greater heartiness because I am already very much in your debt for your selection of me to deliver the Bowman Lecture of 1885,[1] and to open a discussion on that most important neurologico-ophthalmological subject, optic neuritis.[2] There is no department of medicine which has greater attractions for me than ophthalmology has. It was the first subject I specially worked at after my student life, and I still think what I said when giving the annual address, 1887,[3] before the Medical Society, that it was "the luckiest thing in my medical life that I began the scientific study of my profession at an ophthalmic hospital." Many years ago I had the good fortune to be Mr. Hutchinson's clinical assistant at Moorfields. I suppose it is to his example and teaching that I owe the beginning of the little scientific development I may have. At an ophthalmic hospital one has the opportunity of being well disciplined in exact observation. When a physician sees how carefully and precisely ophthalmic surgeons investigate the

[1]Trans. Ophth. Soc., vol. vi.

[2]Op. cit., vol. i.

[3]Ophthalmology in Its Relation to General Medicine. British Medical Journal, May 12, 1877, et seq.

simplest case of ocular paralysis, he is getting a lesson in exactness, and will be less likely in his own department of practice to deal in such generalities as that a patient's seizure "had all the characters of an ordinary epileptic fit," and more likely to take pains to describe the convulsion, the place of onset, the march and the range of the spasm. I suppose I must have felt myself under the kind of discipline mentioned when I wrote about twenty-three years ago:[1] "Until physicians work at the muscular disorders of various convulsive seizures as carefully as ophthalmic surgeons do at paralysis of the ocular muscles, our knowledge of convulsions will not advance in an orderly way." One meaning of science is exactness, or, as Dr. Buzzard put it in suggesting a name for a celebrated painting, "science is measurement." The ophthalmic surgeon measures the swelling of the discs in optic neuritis, the degree of error of refraction in hypermetropia, astigmatism, etc., and makes exact charts of the field of vision.

Although I do not congratulate you on your present choice, I think it a good thing that the President of this Society should sometimes be a physician. It will encourage physicians, especially young physicians, to work earnestly at the ophthalmological aspect of cases of patients under their care. By doing so they may repay part of the great debt to ophthalmology which general medicine, and especially neurology, is under. Part of this debt has been paid by Charcot, Westphal, Weir Mitchell, Gowers, Clifford Allbutt, Ferrier, Seguin, Stephen Mackenzie, Bristowe, Wilks, Sharkey, Edmunds, Herbert Habershon, Samuel West, James Anderson, and many other physicians. I would particularly mention Gower's magnificent work Medical Ophthalmoscopy, a work esteemed by neurologists throughout the world. The recent researches of Beevor and Horsley on localization of ocular movements in a particular region of the cerebral cortex of monkeys is an important contribution to ophthalmology as well as to general medicine and surgery.

[1]Roy. Lond. Ophth. Hosp. Rep., vol. v, part 4, p. 268

Since six cranial nerves and the sympathetic nerve supply the eyeball and its apparatus, it is evident that, without a good knowledge of eye diseases, the thorough investigation of very many morbid affections of the nervous system is not to be methodically carried out. It is easy to show that this statement is by no means a mere truism. Unless the physician uses the ophthalmoscope by routine, he will often enough overlook the best evidence—and I am convinced in some cases the only decisive evidence—of gross organic disease of the brain there is to be had; and if, as is most often the case in a physician's practice, sight be good, he will not surmise that there is anything wrong with his patient's optic nerves, and will very likely be incredulous when someone who has looked at them tells him that there is swelling of the discs. It is not very many years since the ophthalmoscope was rarely used except by ophthalmic surgeons. Dr. John W. Ogle was the first physician in this country who used the instrument in the investigation of medical cases. I think it very unlikely that there is to-day a single patient in the National Hospital for the Epileptic and Paralyzed whose eyes have not been examined by this instrument.

I was very much struck by the frequency with which Dr. Macewen, of Glasgow, mentioned optic neuritis in his paper, "The Diagnosis, with Especial Reference to Localization of Intracranial Lesions, the Result of Aural Disease," read at the Leeds meeting of the British Medical Association last August. This paper is a most valuable contribution to ophthalmology, otology, and surgery. I urge young physicians to study eye diseases at an ophthalmic hospital or at an ophthalmic department of a general hospital; this nowadays needs no urging on physicians especially interested in neurology. A superficial knowledge will not suffice. Without special knowledge of ophthalmology a medical man may overlook paralysis of a superior oblique muscle altogether—may not know that there is any eye trouble at all; if so he will misinterpret the vertigo for which his patient consults him. The physician's ophthalmological knowledge should be wide. A neurologist who

thought only of those ocular symptoms which pertain to the nerves of the eye and their centres would be thinking too narrowly for practical purposes. Unless more widely trained in ophthalmology, he would overlook hypermetropia as a cause of headache and other nervous symptoms, and might thus treat by drugs a condition only needing spectacles for its cure. Again, the physician may, if he does use the ophthalmoscope, misinterpret what he sees if he does not know the morbid results of strain of hypermetropic eyes on the optic discs; he may erroneously consider swelling of the discs due to hypermetropia as a neuritis signifying serious brain disease, and treat the patient on that hypothesis. I infer that there is some excuse for this mistake when made by a physician, and I confess that I have made it, as I have known more than one highly accomplished ophthalmic surgeon to be, for a time at least, in doubt in such a case.

I hope I shall be pardoned for making one more quotation from the address delivered before the Medical Society; I repeat emphatically that "without a good knowledge of ophthalmology a methodical investigation of diseases of the nervous system is not merely difficult, but impossible."[3] Indeed, no physician will, I submit, doubt this who reads Mr. Swanzy's Bowman Lecture, printed in our forthcoming volume of Transactions, a most able and very valuable contribution to both neurology and ophthalmology.

I speak again of optic neuritis with gross organic brain disease. I suggest that cases of uniocular neuritis with tumor of one cerebral hemisphere (I have only seen three cases with necropsies) are the cases which, after microscopical examination of the parts concerned, will throw most light on the process by which optic neuritis results from disease of various parts of the encephalon. These cases are most likely to come under the care of physicians. The discovery of this process will be a great gain, not only to ophthalmology but to neurology also. For, presumably, the process by which the patho-

[3]British Medical Journal, May 12, 1877, p. 575.

logical condition for some other symptoms, occurring in cases of gross organic brain disease, is produced is similar. At present there are only hypotheses as to this process. I find that I am sometimes quoted as having concluded that optic neuritis results by vasomotor action, whereas I have only said, what I still think, that that hypothesis seems to me to be the most plausible of the three hypotheses I spoke of.[6] I would remark that an adequate hypothesis has to explain not the neuritis only, but some other pathological conditions, also produced by intracranial tumors. We may put for answer the more general question: How does a tumor, say of the cerebral hemisphere, produce symptoms not explainable by its destructive action? It is well known that some patients, subjects of optic neuritis, and who for most of their time see well, have frequent temporary losses of sight. It is very remarkable to observe a patient stagger into one's room quite blind and then to find him next minute seeing quite well, although with double optic neuritis. Dr. Samuel West has recorded in our Transactions, vol. iii, p. 136, a valuable case of the kind. So striking and so very definite a symptom demands explanation as much as do epileptiform seizures, which often result from the same tumor of the mid-cortex which produces double optic neuritis. Neither of these paroxysmal symptoms can be put down to the destructive action of the tumor. I submit that they depend on diametrically opposite changes; that there is exalted instability of cortical grey matter—a condition induced by the tumor, probably by a local encephalitis, a condition permitting occasional sudden excessive nervous discharges. An acceptable hypothesis has to account for these two symptoms as well as for optic neuritis. It has still more to account for.

There are other symptoms sometimes occurring along with optic neuritis from intracranial tumor which require explanation; and this I hope physicians will endeavor to give. Dr.

[6] Trans. Ophth. Soc., vol. i, p. 90.

Buzzard[7] made the following remarks: "Was it possible * * * that the vomiting and the slowing of the pulse might represent an affection of the pneumogastric brought about by the same cause as that which produced optic neuritis, and that the sudden or rapid death which Dr. Hughlings Jackson had mentioned as one of the possible contingencies of optic neuritis from intracranial disease might also be explained by a more severe influence exerted upon the same nerve?" It is very remarkable that many patients with optic neuritis die suddenly or rapidly, and when seemingly in fair general health, sometimes at work, certainly most unexpectedly. I have often urged this on the attention of physicians. In some cases of cerebral tumor the patient may be acutely ill; he may have an illness very like tubercular meningitis in many of its symptoms; there may be slow and unrythmical pulse and irregular respiration; there are retracted belly, constipation, and vomiting. I suppose that when a patient who has post-neuritic atrophy tells us that his sight failed after "bilious" or "gastric" fever, he has had such an acute illness. Dealing with certain cases of optic neuritis in children, Hutchinson wrote:[8] "Nearly always there is a history of a severe illness, which was supposed to be fever, and was marked by delirium and other head symptoms."

The organic, or, as one may call them, the "vital" symptoms I have mentioned, are of great importance to the physician. Speaking figuratively, a cerebral tumor in producing optic neuritis is trying to make the patient blind; in producing the other pathological conditions, those of the "vital" symptoms, it is trying to kill him. Following up Dr. Buzzard's very luminous suggestion, I advise that when a patient with optic neuritis dies suddenly or rapidly or dies in an illness with the "vital" symptoms mentioned the medulla oblongata as well as the optic nerves and tracts should be searched microscopically. There is, however, something to be said against the location of

[7]Trans. Ophth. Soc., vol. i, 1881, p. 98.

[8]Roy. Lond. Ophth. Hosp. Rep., vol. v, 1866, p. 307.

the changes under remark in the medulla. It is perfectly certain that the organic parts, although represented directly in the medulla oblongata, are indirectly represented (represented over again or re-represented) in the mid-cortex of the brain; hence it may be thought the "vital" symptoms spoken of are owing, not to morbid changes induced in the medulla, but to such changes provoked by the tumor in the cortex in its neighborhood, especially as it is unquestionable that the tumor does produce the changes round about itself on which epileptiform seizures depend. This I think unlikely, especially when the tumor is in one-half of the brain. I now wish particularly to mention that, as Fagge[9] pointed out, some patients die of cerebral tumor by rapid respiratory failure. In one case under my care artificial respiration was tried, so respiratory, so to speak, was the condition. I cannot but think that in death by failure of respiration in cases of intracranial tumor there have been morbid changes akin to optic neuritis induced in the respiratory centres of the medulla oblongata. It must be borne well in mind that, strictly speaking, optic neuritis is not a symptom, although it is the custom to call it one, but a pathological condition; often enough it exists without any symptom (defect of sight) attending it. Hence it compares, not with convulsion and the "vital" symptoms, but with the pathological conditions of the cortex or medulla on which they depend.

I would submit to ophthalmic surgeons the importance of minutely investigating not only well-marked epileptic and epileptiform seizures, but also any slight transitory symptoms, with or without loss of consciousness, which patients with optic neuritis may have, especially when there are with them "subjective" sensations of smell or taste. These transitory and quasi-trifling symptoms may be slight epileptic paroxysms of a very important variety; their study when optic neuritis exists is important with regard to localization of changes productive of epileptic paroxysms of different kinds. In the vast majority of cases of epilepsy proper we discover no morbid changes

[9]Prin. and Prac. of Medicine, vol. i, p. 10; 2nd ed.

post mortem; when there is optic neuritis with epileptic seizures, we mostly find a very obvious change, often tumor of the brain; we can then infer the situation of the secondary changes in grey matter productive of epileptic fits of different varieties. It is quite certain that our present definite knowledge of epileptiform seizures in man comes from the study of those of these cases which are complicated by optic neuritis; and I have no doubt whatever it will be so in cases of epilepsy proper. By such work as I have indicated, we shall break up epilepsy proper into its varieties as we have done epileptiform seizures. No case of epilepsy, certainly no case of epileptiform seizure, is properly investigated unless the ophthalmoscope be used.

Dr. James Anderson has recorded[10] a case of tumor of the left temporo-sphenoidal lobe. In this case there was atrophy of both discs, but some weeks before death neuritis of one of them. There were also slight epileptic seizures, with "subjective" sensations of taste along with what is commonly called an "intellectual aura," but which I prefer to name "dreamy state." Such cases are of very great medical interest, and are of vastly more scientific value than scores of cases of epilepsy in which no organic disease of the brain is discovered *post mortem.* I have published a case of optic neuritis in which there were slight seizures with "subjective" sensations of smell along with the "dreamy state." [11] The patient died rapidly, as is so common in cases of optic neuritis, but no necropsy was obtained. In that number of *Brain* I have dealt with this variety of epilepsy (the one with the "dreamy state"), and refer briefly to a case under the care of Dr. Beevor and myself in which there were optic neuritis and hemiplegia, and also paroxysms with "subjective" smells and the "dreamy state." In this case also there was a tumor in the temporo-sphenoidal lobe. This case and Dr. James Anderson's patient's case are important, as bearing on and confirming Dr. Ferrier's cortical localisation of smell and taste. These are the only cases I

[10]Brain, October, 1886.

[11]Brain, July, 1888, p. 179.

know of, and one was uncompleted by necropsy, in which the variety of epilepsy I have spoken of has been found with optic neuritis. Such paroxysms being very slight, and not always attended by unconsciousness, might be easily ignored in cases of severe brain disease. I very much hope that ophthalmic surgeons will observe minutely, and with their customary precision, slight temporary "sensations," "queer feelings," etc., which patients with optic neuritis may complain of.

There is no end to speaking of the integration of ophthalmological and neurological knowledge. The ophthalmic surgeon studying nystagmus is helping toward the elucidation of the nature of tremor, in which the neurologist is greatly interested. Great attention should be paid, both by ophthalmic surgeons and physicians, to the tremor (Marie) in cases of Graves's disease—one of the four varieties of "vibratile tremor" of Charcot.[12] Work done on miners' nystagmus is valuable to the general body of scientific medical workers, as helping to complete the homologous series of professional spasms, of which writers' cramp is the commonest example. The work the ophthalmic surgeon has done on the symptomatology of cases of paralysis of ocular muscles gives the clue, as Wundt long ago suggested, to the interpretation of in-co-ordinations experimentally produced by destructive lesions of nervous centres in animals. I think it gives the clue also to the interpretation of all disorders of co-ordination in man, including writers' cramp and other occupation spasms, from negative lesions. It explains the squinting resulting from hypermetropia; I think, too, that it explains the seeming alterations in the size of objects after instillation of atropine and eserine, a thing of importance, since these alterations occur at the onset of some epileptic fits.

In the field of the eye we are most likely to be able to trace the ascending complexity, speciality, etc., in the evolution of movements from the ocular muscles to their representation in most complex movements in the highest motor centres,

[12]Diseases of the Nervous System, vol. iii, Syd. Soc., p. 186.

that is, in the physical bases of visual ideas. Whilst a man is looking at anything, there is at that time engagement of all orders of centres from highest to lowest, and thence on to ocular muscles.

Much valuable material has been accumulated for the study of the evolution of ocular movements by Graefe, Hutchinson, Priestley Smith, Vulpian, Prevost, Ferrier, Horsley, Beevor, and others. We have clinical observations on ocular paralyses from disease of (1) nerve trunks, of paralyses from disease of (2) lowest motor ocular centres (ophthalmoplegia externa), of ocular paralyses (as in lateral deviations of the eyes), from lesions of (3) still higher centres ("motor region" of the cerebral cortex, or, as I call them, middle motor centres), and I hope we shall have such observations of ocular paralyses from lesions of (4) motor centres still higher—the highest motor centres, the physical basis of visual and of other mental states. I have considered this subject in the Bowman Lecture (1885).

There is no task I would rather accomplish than this, for by doing it we should do very much toward showing that the organ of mind is sensori-motor, as is the rest of the nervous system. We should thus place the study of epilepsy proper and insanity on a realistic basis. I have long urged a study of the evolution of movements, and first of all in ophthalmic journals. "If such an expression be permitted, there is a gradual increase in intelligence in movements from the lowest nerve trunks to the highest nervous centres." This, written in 1866,[13] expresses crudely what I think can be scientifically stated as a basis for investigation.

Alienist physicians, being more than any other physicians directly interested in the anatomy and physiology of the nervous system as they correspond to psychology, are of necessity interested in ophthalmology, and are in great debt to it. I hope they will be interested in the scheme of work suggested on evolution of ocular movements; but now I speak of some-

[13]Roy. Lond. Ophth. Hosp. Rep., vol. v, part 4, p. 290.

thing more definite. I do not see how any question can be more important or more fundamental in nervous physiology, as it expressly corresponds to psychology, than whether mental states do or do not occur with the "out-going" current, as well as with the "in-going" current.

Now the battlefield of this question is the case of paralyses of ocular muscles when the full symptomatolgy of those cases, particularly "erroneous projection," is considered. There are reasons more on the surface why alienist physicians should co-operate with ophthalmologists. Much has been done in the study of ocular symptoms of cases of insanity (Westphal, Allbutt, Wiglesworth), but much remains to be done in this direction. Great good would come from investigation of such an insanity as general paralysis by skilled ophthalmic surgeons conjointly with experienced alienist physicians and other neurologists. I very much wish this joint investigation could be made.

Physicians should try to help ophthalmology by bringing forward cases little likely to come under the notice of ophthalmic surgeons. Cases of spasmus nutans with nystagmus (a variety, I think, of spinal, or rather, spinal-system chorea, a symptomatic condition akin to canine chorea), would, as "living specimens," interest all our members. I wish surgeons who see cases of so-called traumatic tetanus would settle whether the muscles of the eyeballs do or do not suffer spasm in the exacerbations of this disease. If the ocular muscles are not involved their escape is a matter of great importance and significance, especially to neurologists. Physicians and ophthalmic surgeons ought to note the motor condition of the eyes in the tetanus-like seizures sometimes occurring in cases of tumor of the middle lobe of the cerebellum. Very much more could be done by physicians in the observation of the development and the order of development of ocular movements in cases of epileptiform seizures from mid-cortical disease. I hope that Horsley's promised demonstration before the Society of the representation of ocular movements in certain parts of the monkey's cortex cerebri will be a stimulus

to our medical members to note very carefully the behavior of the eyes in the "cortical fits" of man.

I think aural surgeons should bring before us cases of great ophthalmological interest. I have published the case of a man who had ocular movements during a paroxym of auditory vertigo,[14] and that of a woman[15] in whom lateral movements of the eyes were producible by pressure on a diseased ear. Mr. Laidlaw Purves gave me most important help in the investigation of the woman's case, as did also Mr. Couper. If such cases are met with by Mr. Purves, I hope he will let us see them, especially as he, having great ophthalmological knowledge, would investigate the ocular as well as the aural side of the cases thoroughly. Dr. Kipp, of Newark, New Jersey,[16] has recorded several very important cases of abnormal ocular movements in cases of ear disease. He refers to cases recorded by Bürkner, Urbantschitsch, Jacobson, Gruber and Moos, as well as to the two I have reported. I think all ophthalmic surgeons will be interested in Dr. Kipp's researches.

Speaking of otology, I admit that a knowledge of this department of medicine as well as of ophthalmology is of vast importance to the neurologist. I regret very much that I did not years ago pay as close an attention to otology as I did to ophthalmology, especially as the cases just referred to show that the two are related. Let young neurologists take warning so that they may not afterward have like regrets.

I have illustrated the relation of ophthalmology to general medicine by its bearing on neurology; it has, of course, much wider relations. I can best conclude this address by adopting the words with which Dr. James Anderson ends a paper:[17] "It seems to me the best and most hopeful feature of ophthal-

[14]Brain, April, 1879.

[15]Trans. Ophthal. Soc., vol. iii, 1883, p. 261.

[16]Trans. American Otological Society.

[17a]'Some Ocular and Nervous Affections in Diabetes and Allied Conditions,' Ophth. Review, February to April, 1889.

mology that it has relations closer or more remote with every branch of medicine and surgery—indeed, with almost every branch of science."—*Brit. Med. Journ.*

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THURSDAY, OCTOBER 17, 1889.

J. HUGHLINGS JACKSON, M.D., F.R.S., President, in the chair.

The introductory address by the President will be found on page 911 of the *British Medical Journal.*

On the Pathology of Trachoma and the Relation of this Condition to the other Forms of Conjunctival Inflammation.—This paper by Dr. Thomas Reid, of Glasgow, was presented by Mr. Brailey. The author regarded the occurrence of groups of lymphoid cells at varying depths in the sub-epithelial layer as the essential part of trachoma. Those may be ill defined (lymph heaps) or more distinctly bounded (lymph follicles), though never possessing a perfectly defined limiting capsule. Their lymphoid elements are pervaded and supported by a very delicate stroma. Generally there is some infiltration of lymphoid cells around them which may even extend from one group to the next, and so on. Their origin is not a matter of absolute certainty, but the author is inclined with Michel to regard them as the dilated ends of the lymphatics of the conjunctiva. These lymphoid groups lead to changes in the epithelial layer, the deeper stratum of which may become vacuolated by œdema, so that the individual cells are often extended into a stellate form. Later, many of the cells may become distended and their nuclei pressed to one side, so that the characteristic appearance of goblet cells is presented. These may discharge their contents, leaving their walls standing and their nuclei attached to their floor, so that, after the throwing off of the condensed superficial epithelial layer, a

matter of not uncommon occurrence, the remains of the goblet cells constitute a series of irregular papilliform elevations characteristic of true forms of dry catarrh. Another important change, the development of mucous follicles, may take place in connection with the goblet cells. When the lymphoid groups, instead of being absorbed, have increased considerably in size, each one, with its covering of altered epithelium, or a small group of them, is apt to constitute a marked elevation of the conjunctiva, separated on each side from its neighbors by a deep depression. The layer of goblet cells occupying these depressions is frequently folded in so as to form a small pouch which may be much enlarged, so as to constitute a rounded mucous follicle which communicates by a short duct with the conjunctival surface. As above described, these mucous follicles are usually developed between the lymph follicles; but occasionally one and even several small mucous follicles can be seen occupying the centre of a single lymph follicle. Though usually flask-like, they are sometimes more tubular in form, presumably before the discharge of their individual cells, and the consequent accumulation of their contents. Though the lymph heaps or follicles may disappear by absorption, presumably by escape into the lymphatics, they perhaps more often discharge themselves externally by thinning and destruction of the overlying epithelium. There is always to be noted a tendency to softening and degeneration of their central part, as indicated by less definite structure and more feeble capacity for staining. Finally they may, instead of disappearing, become invaded by blood vessels, and gradually converted into a dense connective tissue, which situated in the ridge-like or papilliform elevations above alluded to, forms the grey gristly granulations characteristic of the advanced stages of severe trachoma. Careful examinations for bacilli have led to negative results, though the author is disposed to regard the implication of the cornea as a secondary infective process. In follicular conjunctivitis the author finds similar lymphoid groups and mucous follicles; also he has determined, by microscopical examinations, that the stage of grey gristly granulations

may be eventually reached; consequently, he regards the two affections as essentially one, though he recognizes that the vast majority of cases of so-called follicular conjunctivitis may be distinguished clinically from trachoma in that they do not tend to the development of the grey gristly cicatricial tissue. In some advanced cases of purulent ophthalmia he has found lymph follicles, and also in some cases of apparently simple long-standing conjunctival hyperæmia. The essence of purulent and catarrhal conjunctivitis, and also of conjunctival hyperæmia, appears to be a vascular congestion which may lead to a secondary lymphatic congestion, and the consequent formation of the lymph heaps and follicles, whereas trachoma and follicular conjunctivitis are from the outset essentially affections of the lymph follicles. This will account for the occurrence of mixed forms, as in Egyptian ophthalmia, and for the occasional occurrence of one-sided trachoma as a sequence to long-standing conjunctivitis of other forms. In conclusion, the author does not connect the lymph follicles or mucous glands with any of those glandular structures which are rarely found in the normal conjunctiva.—The paper was illustrated by microscopic preparations in the forms of photographs and magic lantern slides.

Keratitis from Paralysis of Fifth Nerve.—Notes of this case by Mr. W. E. Cant were read by the Secretary. The patient, a lad, æt. 16 years, attended at the British Ophthalmic Hospital, Jerusalem, on July 17, 1888, with complete paralysis of the left fifth nerve. The left eye showed some general injection, and the cornea were diffusely hazy. A history was obtained of an injury by a reaping hook two or three weeks previously, and a doctor who saw the lad two days after the blow had been inflicted found him in a semi-conscious state. There was a small penetrating wound of the squamous portion of the left temporal bone, about an inch above the insertion of the auricle; into this wound a probe could be passed to a depth of rather more than one inch. When seen again, on July 22, the left cornea was quite opaque, of a milky white color; there was much general congestion of the eye. He was admitted to the

hospital. During the next three weeks the condition of the left cornea became rather worse, and marginal ulceration occurred. The paralysis of the fifth nerve remained complete. The patient then left the hospital, and was not seen again for four months. When he returned the left cornea had partially recovered, but was still generally hazy. The function of the fifth nerve, both muscular and sensory branches, had been regained, but to only a limited degree. Mr. Cant thought the case had been one of direct injury to the whole fifth nerve within the skull, between the brain and the Gasserian ganglion, or at the latter.—*Brit. Med. Journ.*

ERRATA.

On page 269, on the first line from the top, read *past* instead of *next.*

On the same page, on the fourth line from the top, after *extirpate* insert *the.*

On page 270, on the sixth line from the bottom, insert between *before* and *infiltration* the following words: *closing the wound or extensive.*